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Alberta
AGRICULTURE

Research Report

Scientists Terry Church and Susan Wilson

237,000 cattle tell a story

A five-year feedlot study produces some surprising results

Involving more than 237,000 animals, it is the largest veterinary study ever undertaken in the free world. Dr. Terry Church, acting director of Alberta Agriculture's Animal Health Division, and Dr. Susan Wilson of Saskatoon's Veterinary Infectious Disease Organization (VIDO) have been gathering facts, crunching numbers and monitoring cattle at seven Alberta feedlots since 1981. They had set out to uncover the reasons for the occurrence of bovine respiratory disease, an ailment thought to be responsible for up to 80% of sickness and death among feedlot cattle. What they expected to find and what they actually discovered,however, are different things. Bovine respiratory disease, says Dr. Church, is not nearly so widespread as was expected, while other ailments, like foot rot, were found to be surprisingly common.

The study, aided by a $544,000 Alberta Agriculture Farming For The Future grant, in addition to the support from VIDO, was undertaken at existing feedlots, two in the Lloydminster area, three near Calgary and two in southeastern Alberta. Beginning in 1981, with the help of trained technicians, Dr. Wilson collected management records at each lot, observing and recording information on site. She was careful not to interfere with the everyday operations of the lots. "This was not a laboratory design of what we think goes on," she says. "This is reality. It gives us a complete picture of what happens to both sick and healthy animals in feedlots."

She recorded information on the purchasing and transport of cattle, feeding and watering routines, bedding and ground conditions, weather conditions, the type of housing, among many other factors. She also looked closely at the characteristics, diagnoses and treatment of sick and dead animals, and at methods of mass medication.

All the information was compiled into a single, massive data base from which conclusions are gradually being drawn. The researchers have already determined that a third of all animals, and 50% of those requiring treatment, were suffering from foot rot, an infection of the soft tissue of the feet caused by microorganisms entering a cut or abrasion. A full 25% of all deaths in the lots were due to digestive diseases such as bloat and grain overload. Dr. Church expects some people will be disappointed that the research was unable to finger one single reason (for instance, where animals were purchased) for the vast majority of losses, but complex problems, he reasons, often require complex solutions.

In the long run, the data base itself will likely be the most important aspect of the study. Nothing like it exists anywhere, says Dr. Wilson, because studies of disease patterns in cattle are few. Feedlot owners will be able to use the data to determine what management practices and environmental factors prevent or cause disease, and scientists will be able to use it for new and more specific research projects.

Dr. Wilson intends to use the data to create a formula which can be used by cattle feeders to predict the probable level of disease in any given group of animals. For example, a buyer considering the purchase of 100 steers

(continued on back page)

The age of specialization

Researchers work with farmers to develop alternative crops

With international prices for traditional cereal and oilseed crops much lower than usual, and with forecasts indicating little improvement in the near future, many Alberta farmers are looking for new sources of revenue. Dr. Refe Gaudiel, a research agronomist at the Alberta Special Crops and Horticultural Research Centre in Brooks, says a significant number are turning to special crops — everything from lentils to sunflowers — and they are earning substantial profits. In 1985, farm cash receipts for special crops such as potatoes, sugar beets, vegetables, flowers and nursery trees totalled $114 million. The sales of more exotic crops such as mustard and mushrooms brought in another $32 million. "It's an alternative every farmer should consider," says Dr. Gaudiel. "There's an urgency to it now because cereal crops are not moving, but special crops will also diversify the agricultural economy and provide more stability in the long run. All our eggs won't be in one basket."

With a $220,264 grant from Alberta Agriculture's Farming For The Future program, he has been testing the suitability of certain crops to the dark brown soil zones of Alberta. These zones are marked by shorter, cooler growing seasons. He grew and analyzed the crops in small quantities to see how quickly they matured (which tells him how adaptable they are to the region) and to determine what kind of yields can be expected (which tells him if the crops are economically viable.)

Central Alberta proved best suited to field peas, canary seed, faba beans, caraway and buckwheat. Lentils, says Dr. Gaudiel, are also a possibility but there is some risk — it is a late maturing crop. On dryland in southern Alberta, lentils, sunflowers, safflower, canary seed, mustard and grain corn all did well, and on irrigated land, he says, almost anything can be grown.

One big advantage to special crops, says Dr. Gaudiel, is that there are no quotas for producers (the Wheat Board limits the amount of wheat and barley farmers can grow). A farmer can put everything he produces on the market, and many of the crops can be sold by contract directly to private companies. Another advantage is the earlier payoff. Private contractors generally pay quicker than the Wheat Board which sometimes makes final payments up to a year after delivery. And in addition to opening doors to new markets, special crops have been known to spawn secondary industries and create new jobs in the local economy. "A good example," says Dr. Gaudiel, "is the processing, cleaning and packaging of dried beans in Bow Island."

Some advantages of special crops are more subtle. Green legumes, for instance, can be used in a rotation system with cereals. They help control disease and pests. "Growing only monocultures builds up insect populations," says Dr. Gaudiel. "Special crops break bad cycles, helping to control weeds, especially broadleaf weeds, which reduce cereal yields. In addition, the nitrogen fixing legumes improve fertilization, increasing the yields of cereal crops that follow."

He considers legumes some of the more interesting special crops because of their nitrogen fixing quality, but he is also excited about the prospects for growing exotic herbs and spices in Alberta. "We haven't grown ginseng in the province yet," he says. "It's a mysterious business and it takes a long time to grow. It has to be grown in the shade. But if we could do it . . . sometimes a single root can command a few thousand dollars."

Some special crops require specialized farming knowledge and technology,

"There's an urgency to it now because cereal crops are not moving, but special crops will also diversify the agricultural economy and provide more stability in the long run. All our eggs won't be in one basket."

while others can be grown without difficulty by any grain farmer. Dried beans, for example, require a large initial expense in row crop planters and cultivation equipment. They are harvested by cutting an inch below the ground and then they must be swathed and threshed without cracking the beans. Canary seed, on the other hand, requires only ordinary equipment and basic skills. If a farmer can grow wheat, he can grow canary seed. The rest of the crops fall in between.

Bob Park, an Alberta Agriculture supervisor of special crops at Lacombe, says some of the crops have unusual markets. Canary seed, for instance, goes exclusively to feed caged birds in New York City and the eastern seaboard. Taiwan and Korea, he says, buy sunflower and safflower to feed their birds. "And of course there's corn," he says, "much of which ends up in whisky." Mr. Park says western Canada is developing a reputation in these markets for high quality crops. Between 70% and 80% of special crops are now exported, mainly to South America and Europe.

There is no doubt that Alberta farmers are beginning to see the advantages of special crops. While most are only converting a portion of their cereal land to new products, the rate of conversion has increased tremendously in the last year. In 1986, 16,500 acres were dedicated to lentils compared to 60,000 acres this year. Some 27,500 acres were given over to dried peas last year compared to 150,000 this year. In 1977, only 139,000 acres in Alberta were dedicated to special crops. In 1986 that figure climbed to

Field test results

Dr. Gaudiel was also project advisor to special crops demonstration trials undertaken by Chinook Applied Research Association with a $47,958 grant from Alberta Agriculture's Farming For The Future On-Farm Demonstration Program. Seventeen special crop varieties, including Neepawa wheat as a check, were seeded at two sites and monitored throughout several growing seasons.

In 1985, at the first site, the Greg Gordon farm in Hanna, Alberta, field conditions were good at seeding. All crops came out of the ground quite well but most suffered during an especially hot and dry summer. An early frost hurt those crops that mature late and birds did significant damage on the corn and sunflowers. While the traditional Neepawa surpassed most crops in pounds of production per acre, it did not do so well economically. Several special crops yield more return per acre, particularly the lentils.

At the second site, the Don Clark farm in Altario, Alberta, seeding conditions were also good but the same hot, dry summer impaired growing. Safflower, corn and sorghum suffered in an early frost. The results at this site were otherwise quite similar to those at the first site. The farmers were interested in the potential of safflower because of its hardiness and tolerance for drought. They were also impressed by the substantial yields of confectionary sunflowers.

CANADIANA
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FARMING FOR THE FUTURE

by J. Harold Hanna
Assistant Deputy Minister
Production Sector

The Production Sector of Alberta Agriculture's goal is to promote the economic production of crops and livestock. Part of the challenge is to encourage cropping and husbandry practices which maximize efficiency but are consistent with the conservation of our land and water resources.

As part of its ongoing responsibilities, the sector is involved and committed to agricultural research and the practical application of new technology. The work of Dr. Terry Church (see cover) and the project of Dr. Gaudiel (see page 2) are good examples of the kind of research we do.

Dr. Gaudiel works at the Special Crops and Horticultural Research Centre in Brooks, one of many research and scientific facilities operated by the sector. Previously known as the Alberta Horticultural Research Centre this facility was renamed on April 1, 1987. The change reflects the growing emphasis the Department is putting on special crops research to help Alberta producers diversify into profitable enterprises. Complementing our horticultural research work at Brooks is the Tree Nursery and Horticultural Centre at Oliver, where activities relating to ornamentals and market gardening are conducted. At another research facility, in Lacombe, the Field Crops Branch carries out valuable work in plant breeding. As a result, five new grain varieties have been developed.

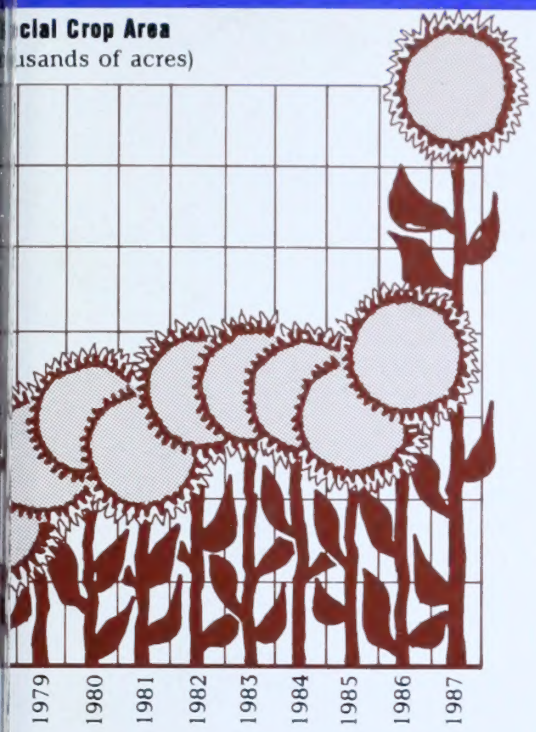
I'd like to tell you about the research involvement of some of our other branches. The Animal Health Division's Health Management Branch has just concluded a major study of the risk factors in feedlot cattle associated with disease. The Pathology Branch carries out applied research in all classes of livestock and poultry. Regional Veterinary Laboratories in Fairview, Airdrie and Lethbridge investigate unusual or serious disease problems.

The Crop Protection Branch supports research in crop rotation, weed control, the development of new pesticides, and biological pest management. The Soils Branch provides province-wide research programs in soil test calibration, fertilizer rates, soil management, and the diagnosis of specific production problems.

The Beef Cattle and Sheep Branch is involved in breeding, nutrition and management research and demonstrations to solve a variety of problems affecting productivity. The forage evaluation unit at Ellerslie, operated jointly with the University of Alberta, and the only one of its kind in Canada, measures the energy levels and digestibility of Alberta feeds and has become an indispensable resource to livestock producers.

The sector's other branches, Pork Industry, Horse Industry, Poultry, Dairy Production and Dairy Processing also participate in research and demonstration projects. The sector co-operates with other agencies and supports joint research projects.Much of that research has been supported by Farming For The Future.

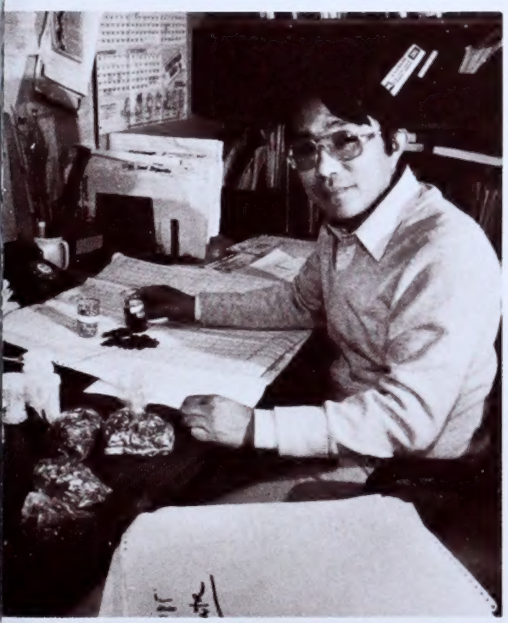
Our goal is always the same. What can we do to make farming and ranching more profitable? The answer is, "plenty". And we are determined to do more.



omparison of the area in special crops 1978 to 1987 in Alberta

s and forecasts for 1987 peg it at 353,500

dermier has been farming just east of Lethbridge and is chairman of the special crops program f the Agricultural Research Council of Alberta. is sponsoring a conference in Lethbridge, 1-13, which will discuss the economics, d production of special crops. Mr. Niedermier been growing special crops for some time but expanded that part of his operation. "It is a s of diversifying to get cash flows going," he a has to look seriously at special crops. We been doing this years ago."



r. Gaudiel and Alberta crop samples

A switch in the ditch

A computer-controlled irrigation system is tested near Lethbridge

For almost 100 years, ditch riders, first on horseback and more lately in pick-up trucks, have been monitoring the canals and laterals of southern Alberta's irrigation system. When a farmer calls to place an order for water, the ditch rider calls the water master at the nearest reservoir who starts the flow. The rider then drives out to manually open the gates (usually stacks of planks blocking a small canal or ditch), clearing the water's path to the farm. It is a time honoured system that has played an important role in the success of irrigated agriculture, and the duties of the ditch rider have remained largely unchanged through the years. But thanks to advances in inexpensive microcomputer technology, the ditch rider may soon be overseeing systems of highly efficient, fully automatic irrigation gates instead of wrestling with planks.

"It might take days for a farmer to get his order filled."

T.G. "Gordon" Ayers, an engineer with UMA Engineering Ltd. in Lethbridge, explains that traditional irrigation operations, known as upstream systems because the water is controlled at the source, are not as efficient as farmers would like. "Water can take 12 to 24 hours to reach Lethbridge from the Ridge Reservoir," says Mr. Ayers. "It might take days for a farmer to get his order filled." The resulting stress on crops, not to mention farmers, can be considerable. The farmer has to predict how much water he wants days in advance, and costly errors are inevitable.

Water managers agree that a downstream system, which would allow farmers to control the flow from a gate within a mile of their property, would be more efficient. Ideally, a farmer would simply open a nearby automatic gate whenever he needed water, and the flow would begin immediately.

UMA researcher with a system model

Computerized sensors on the gate would keep in touch with the main water supply and ensure an appropriate level of water remained in the system at all times. Automated systems, however, have always been considered too expensive for widespread use. In 1979-80, Mr. Ayers and other engineers installed one on a large canal near Picture Butte, Alta. It works well, but its computer hardware cost $100,000. Putting such operations on hundreds of smaller ditches in southern Alberta is simply not feasible. So Mr. Ayers, with a $282,580 grant from Alberta Agriculture's Farming For The Future program, is developing a low cost (under $10,000) unit for small canals.

In his system, the opening and closing of automatic gates on small canals is controlled by a readily available microcomputer worth about $400. The gate itself is a vertically-hinged model invented by Coaldale farmer, Peter Langemann (it swings open, says Mr. Ayers, like the barroom doors in a western movie). The system is solar powered, simple to operate, and durable. Mr. Ayers' prototype system is now regulating the flow of water through seven gates near the Chin Resevoir, 25 miles east of Lethbridge. Last year it experienced only two mechanical failures and one computer failure. While he still has some wrinkles to iron out, he is delighted with the results so far.

"Once we get the package to the manufacturing stage," says Mr. Ayers, "the price for the whole thing should be $5000 to $7000. There is export potential to open channels around the world. As far as we know, no one else has taken automation this far. The State of California has shown keen interest."

cattle tell a story. . . continued from page one

will punch a series of facts into a computer: the distance the cattle are shipped; the feeding routine at their new lot; housing conditions; weather and environmental factors, etc. Using Dr. Wilson's formula, the computer will tell him what to expect in treatment costs and death losses, information which will help him decide if the purchase makes economic sense. And that's good news for Alberta's $1.2 billion cattle industry.

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